Core-top calibration of B/Ca in Pacific Ocean *N. incompta* and *G. bulloides* as a surface water carbonate system proxy

QUINTANA KRUPINSKI, NADINE B[1], RUSSELL, ANN. D[2], PAK, DOROTHY. K[3] AND PAYTAN ADINA[4]

[1]University of California Santa Cruz (* correspondence: nadine@pmc.ucsc.edu)
[2]University of California Davis (adrussell@ucdavis.edu)
[3]University of California Santa Barbara (pak@geol.ucsb.edu)

Modern anthropogenically-induced ocean acidification and global climate change highlight the need for practical methods to reconstruct past ocean carbonate chemistry and atmospheric CO_2 levels to improve understanding of global climate cycles and the marine carbonate system's response to these forcings. In this study, core-top samples from around the Pacific Ocean are used to generate new calibrations of the B/Ca proxy for the past carbonate system in two upwelling and subpolar species of non-symbiotic planktic foraminifera (*G. bulloides* and N. *incompta*, also known as *N. pachyderma*, dextral). Our results show a significant correlation of B/Ca with $[CO_3^{2-}]$ and Ωcalcite, and to a slightly lesser degree with $[B(OH)_4^-]/[HCO_3^-]$ and $[B(OH)_4^-]/[DIC]$, in both species across a broad range of hydrographic conditions, supporting the application of direct empirical calibrations of B/Ca in planktic foraminifera. Calculated boron partition coefficients (K_D) from these samples are uncorrelated with temperature or $[CO_3^{2-}]$ and vary within and between species; we do not find evidence supporting the application of K_D to calculate carbonate system parameters from B/Ca. B/Ca in both species studied here is not significantly correlated with pH, suggesting that calculation of pH directly from B/Ca is not suitable. We also explore the application of this proxy in different regions of our Pacific core-top dataset, and discuss potential roles of temperature, depth-related dissolution and shell weight on B/Ca.